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THE PREVENTION OF THE COMMON COLD

BY DR. R. WILLIAMSON







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**THE PREVENTION OF THE
COMMON COLD**



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THE PREVENTION OF THE COMMON COLD

BY

OLIVER K. WILLIAMSON

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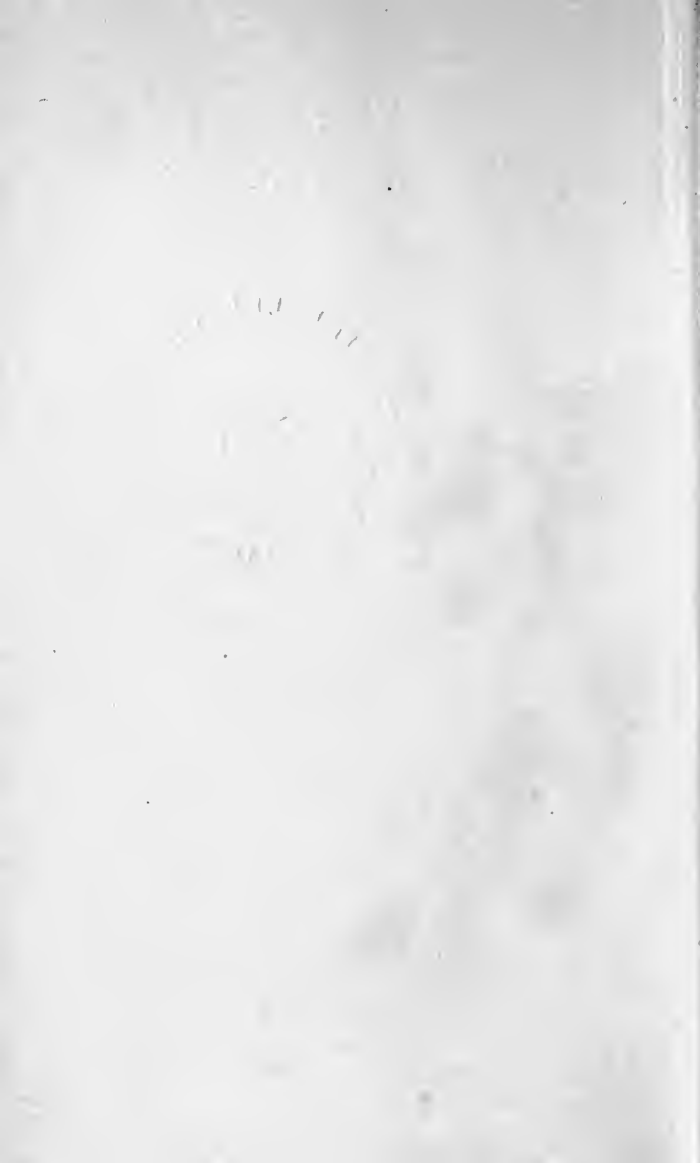
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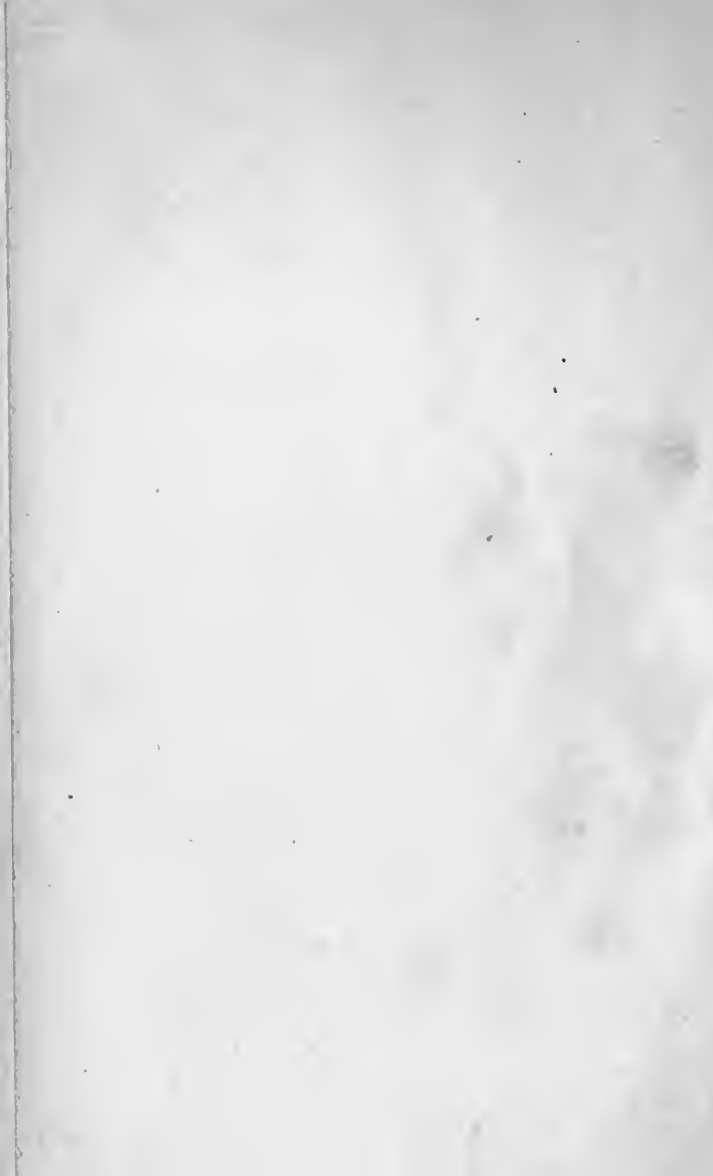
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THE PREVENTION OF THE COMMON COLD

CHAPTER I

INTRODUCTORY

‘Prevention is better than cure.’—*Old Adage.*

OF late years, as the result of the increase in our knowledge of the various factors at work in the causation of disease, the science and art of preventive medicine has assumed a rôle of ever-increasing importance in the minds of men and women : hence no excuse is needed for the appearance of the present work. The frequency of, as well as the disabilities attaching to, the common cold in such a climate as ours will be admitted by all ; the more serious side of the question I shall allude to later. If then it be recognised, as I think will be the case, both by the laity and the medical profession, that the attempt

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to cure is in nearly all cases unsatisfactory, there will be no difficulty in arriving at the logical conclusion that its prevention becomes a matter of paramount importance.

Nevertheless, those outside the medical profession are perhaps too liable to forget that there is a more important point of view of the matter than that of mere inconvenience. It is necessary to point out that a cold may, by lowering the vitality, and hence the resisting power of the individual, be the starting point of serious, and perhaps fatal, lung or other disease, whilst too often in other cases the oft-recurring acute cold, although not directly endangering life, may pave the way for a chronic disease of one or other of the respiratory organs. Again, one is far too often in the habit of assuming that such a cold is due to causes over which he has no control, or that it is in other words unpreventable. No doubt this is to a great extent due to a general impression (an impression quite in accordance with facts which have a scientific basis) that the cold is 'caught,' that is that it is infectious in origin. It cannot however be too strongly insisted upon that in

nearly all cases much can and should be done by common-sense precautions and careful attention to details of health, both in regard to general and local conditions, to prevent the occurrence of this annoying disability.

It is my primary object, in the pages that follow, to indicate how this may be done. The fact that a person has frequent colds implies one of two things : either there is some error in his surroundings or mode of life (and I hope that this little book may help to show where the error lies) or there is some local trouble which should have local treatment. To avoid carelessness in one's habits of life on the one hand, and, if I may coin a word, 'crankism' on the other, should be the aim of all.

Although, as is well known, many people look lightly upon the common cold, there is also a not inconsiderable number who realise that that serious form of lung disease known as consumption of the lungs, or pulmonary tuberculosis, may originate from a neglected common cold.

It is moreover a fact accepted by the medical profession that any one suffering from

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such a catarrhal condition is more liable to this scourge of the human race. It is certain that in other cases the cold may form the starting point of inflammation of the wind-pipe or bronchi, with the result that the patient becomes infected with an acute attack of bronchitis, a disease which may be in itself fatal; even if that is not the case it may become chronic, and result in loss of elasticity of the lungs (emphysema). When this condition obtains, an increased strain is thrown upon the heart, with the result that such a person's life is apt to be materially shortened.

Again, even though the cold may not lead to such extremely serious results, it often serves as the starting point (owing to the anatomical communications of the nasal cavities and pharynx, which will be referred to in the next chapter) of inflammation of the middle ear and accompanying deafness, by spread of the inflammation along the Eustachian tube; or of inflammation, with perhaps the formation of pus (matter), in one of the bony sinuses with which the nasal cavities communicate, such as the Antrum of Highmore, the frontal sinus and ethmoidal cells.

Such an inflammation may exhibit various complications, and may even form the starting point of inflammation of the membranes covering the brain (meningitis), or other fatal intra-cranial disease.

Again, the common cold may render its victim liable to attack by various infective diseases, owing probably to the influence which it exerts by lowering his vitality. It is an accepted medical fact that it will render a child more liable to the infection of measles, and there can be little doubt that influenza is especially liable to attack one suffering from a cold. The above-mentioned examples do not by any means exhaust the list of ills which may result from a common cold, but at any rate enough has been said to emphasise the importance, as far as is possible, of preventing its incidence.

It will be perhaps desirable, for the sake of completeness, to remind the reader of some of the essential symptoms of a common cold. I would here point out that it is a manifestation of what is known as a 'catarrh' of a mucous membrane. Such a mucous membrane (which, as we shall see in the next chapter, is the name

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given to the modified skin which lines the cavities of the body, of which the digestive and respiratory tracts are instances) when irritated by various means exhibits a 'catarrh.' In this condition the normal secretion or mucus, which is poured out by the membrane, becomes impaired and undoubtedly notably diminished, certainly in regard to its watery constituents. There is also an increased flow of blood to the mucous membrane, as well as other changes. Thus it becomes thicker than normal, and is a source of irritation. The onset of the cold is as a rule sudden, with sensations of chilliness, perhaps sneezing, headache in the region of the forehead, and a slight degree of fever with its usual accompaniments.

It is worthy of remark that the feeling of chilliness is one of several symptoms or manifestations of the cold, and it is not the case that the chilliness stands to the cold in the relation of cause to effect. The patient, although not acutely ill, feels uncomfortable and below par, both physically and mentally, the temperature rising to 100° F. or 101° F. There is fullness of the head, the nose feels hot

and 'stuffed up,' and there is a thin, scanty discharge from the nose. There may be aching of the muscles of the back and limbs; there will be a certain amount of nasal obstruction from swelling of the mucous membrane of the nose, and hence the necessity for mouth breathing. The discharge quickly becomes copious and irritating. The sense of smell is diminished or lost, as is also that of taste. In about 24 to 36 hours the acuteness of the symptoms will diminish, and the discharge will become yellow and thick, and then gradually decrease, and as a general rule in less than a week the symptoms will disappear. The above is the picture of an acute case, but needless to say the symptoms vary greatly in different cases. The inflammation in many instances spreads to the pharynx and tonsils, with resulting pain in swallowing solids, hawking and coughing. There will soon be a yellowish-white secretion from the mucous membrane of the pharynx.

In other cases however the cold may spread even further, and involve the larynx (organ of voice), giving rise to hoarseness or loss of voice, or it may reach to the windpipe.

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Again, in other cases the cold may start either in the pharynx, tonsils, or larynx, and affect the nasal mucous membrane subsequently; a common site of origin is the upper part of the pharynx (naso-pharynx). It seems however more usually to begin in the nose.

CHAPTER II

THE STRUCTURE AND FUNCTION OF THE PARTS CONCERNED

BEFORE dealing with the subject proper of this book, it will probably conduce to greater clearness if we consider the salient features in relation to the structure and functions of the upper part of the respiratory tract, in so far as these bear upon the origin of a common cold.

The nasal cavities, one on each side, open in front on the face by the nostrils, and behind by two other openings, also one on each side, the choanae or posterior nares, into the pharynx. The nasal cavities are separated from one another by a thin division called the septum. The cavity of the mouth is the space which is bounded above by the hard palate, in front and at the sides by the teeth, gums, lips and cheeks, and behind by the soft palate and the opening into the pharynx. This

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opening, which is known as the isthmus faucium, is limited above and at each side by the arches of the soft palate, or pillars of the fauces, with the uvula in the middle line. Below, the cavity of the mouth is bounded by the tongue and the sublingual floor. This sublingual floor consists of the parts on each side of, and in front of, the tongue, which are included within the horseshoe of the lower jaw. The soft palate is a fold of mucous membrane forming the hinder part of the roof of the mouth, behind the hard palate. The tonsils are outside the back of the tongue and below the soft palate, between the cavity of the mouth and the pharynx. The pharynx is a cavity behind the nose and mouth which extends downwards from the base of the skull. There are two openings on its upper part, the choanae or posterior nares, by which it opens into the nasal cavities in front; on either side of and outside these are the openings of the Eustachian tubes, one on each side, by means of which the pharynx communicates with the middle ear on either side. In its lower part the pharynx communicates in the front with the mouth by the isthmus faucium, and behind this, by means of the glottis, with the larynx,

STRUCTURE AND FUNCTION OF PARTS II

whilst the last opening, that by which the pharynx becomes continuous with the gullet

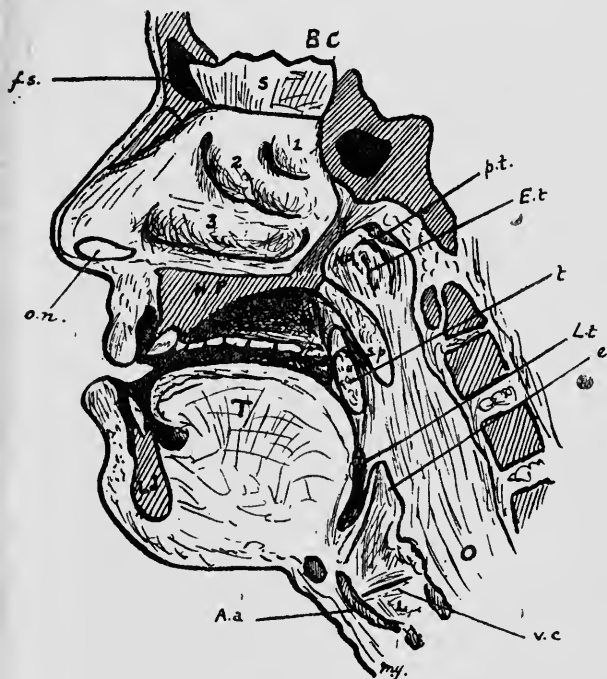


DIAGRAM OF NOSE, ETC.

B.C., Base of cranium. *S.*, Septum of nose turned upwards to show 1, 2, 3, the turbinal bones of the nose. *o.n.*, Orifice of nose. *H.P.*, Hard palate. *s.p.*, Soft palate. *p.t.*, Pharyngeal tonsil. *E.t.*, Eustachian tube. *L.t.*, Lingual tonsil. *T.*, Tongue. *L.*, Larynx. *t.*, Main tonsil. *e.*, Epiglottis. *A.a.*, Adam's apple. *v.c.*, Vocal cord. *O.*, Oesophagus. *f.s.*, Frontal sinus. (Figure lent by Mr. YEARSLEY.)

or oesophagus, is behind this. Thus there are in all seven openings into it, of which four are

above and three below the soft palate. The larynx, or organ of voice, has as its continuation the trachea or windpipe. This tube divides into two, forming the two bronchial tubes, one on each side, each of which becomes continuous by means of smaller ramifications with the air surfaces of the lungs.

Having thus briefly alluded to the relative positions of the subdivisions of the respiratory tract with which we are more especially concerned, it will now be desirable to speak of certain points in regard to the anatomy of these in somewhat greater detail. We have seen that there are two nasal cavities, one on each side. The nasal cavity is wider below than above, and its floor is not flat, but slopes slightly downwards and backwards. That part of the nose just within the aperture of the nostril is known as the vestibule. Behind the vestibule the cavity of the nose is divided into two parts: there is the lower wider region below the middle turbinal bone, the so-called respiratory tract, which extends backwards to the posterior nares. Above this is the narrow olfactory tract. This so-called olfactory tract is traversed, as we shall see,

by the air in respiration, and is therefore, strictly speaking, part of the respiratory tract. The cavity of the nose is partially subdivided by horizontal projections from its outer wall, the turbinal bones; these with the soft tissues covering them constitute the turbinal bodies. Of these bones there are usually three, the upper or superior, middle, and lower or inferior. The superior turbinal bone is practically speaking a subdivision of the middle. They are frequently described as being scroll-shaped, that is to say their inner or septal surface is convex and their under and outer surface concave. The inferior meatus is that portion of the cavity lying beneath the inferior turbinal body, and into it opens the nasal duct. This opens into the conjunctiva, or mucous membrane covering the eyeball, and through it the secretion of the lachrymal gland, known where excessive as 'tears,' normally passes into the nasal cavity as fast as it is formed. Above the inferior turbinal body, and below the middle, is the cavity known as the middle meatus. Into this open passages from certain cavities in the bones of the skull, viz. the Antrum of Highmore, the

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frontal sinus and the anterior ethmoidal cells. The space above the middle turbinal body is known as the superior meatus. Into it open other cavities in the bones of the skull, viz. the post ethmoidal cells and the sphenoidal sinus. The posterior nares are two oblong openings separated from one another by the posterior edge of the septum. The respiratory tract of the nasal cavity is the part in which we are more particularly interested, and what follows applies, unless otherwise stated, only to it. Its mucous membrane¹ is covered by epithelium, that is by continuous masses of cells, of which those on the surface are ciliated, that is they possess on their surface a bundle of fine hairs. A large number of mucus-secreting cells are also met with in this epithelium. In the deeper parts of the mucous membrane are embedded glands, the ducts of which open on the free surface.

¹ A mucous membrane is simply an integument of greater delicacy than the skin, but it consists essentially of the same two layers, a deep fibrous layer which contains blood vessels, and a superficial one called the epithelium. It lines all the interior cavities such as the Alimentary Canal, into which the various apertures of the body open. It gives out a more or less tenacious fluid called mucus.

Some of these yield mucus, some on the other hand a more watery secretion. Beneath the epithelium is fibrous tissue containing lymph corpuscles, that is to say cells similar in structure to the white corpuscles of the blood, and which are capable of movement. In places these cells form what is known as diffuse adenoid tissue, or perfect lymph follicles.

Adenoid tissue consists of a network of fine fibrils, showing in places plate-like enlargements, and having here and there small cell plates fixed on them. The meshes of this network are completely filled by lymph corpuscles of different sizes. In the lymph follicles the adenoid tissue forms oval or spherical masses which are more or less well-defined. In diffuse adenoid tissue, on the other hand, there is no definite arrangement. The mucous membrane is richly provided with blood vessels. Over the turbinal bones, especially the inferior turbinal bone and lower part of the septum, it is much thicker and more richly provided with blood vessels than in the other parts of the nasal cavity, and that which covers the turbinal bones demands

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special notice. Within its lymphoid tissue there are in this region numerous venous sinuses ¹ surrounded by much muscular tissue. The tissue thus constituted is subject to rapid and extreme variations in its dimensions under the influence of atmospheric conditions, mental emotions and other causes. In dry air these bodies retract, in a humid one they swell. When this process of retraction and expansion has been too frequently repeated a condition of vaso-motor paresis ² becomes established, which results in more or less permanent enlargement of the turbinal body with consequent nasal obstruction, technically known as stenosis. The vestibule is lined by modified skin, which bears stiff and short hairs called vibrissae. In the upper or olfactory region of the nasal cavity ciliated epithelial cells only occur in those places which are in close proximity to the respiratory region. There are in this region, besides the other epithelial cells, others which are especially concerned with the function of smell.

The pharynx is much wider from side to

¹ Spaces which lead into branches of veins.

² Deficient action of the controlling nerves.

side than from front to back. Its mucous membrane, in the upper part nearly as low as the base of the uvula, is composed of ciliated epithelium. Throughout the whole of the pharynx there are lymphoid follicles. Its mucous membrane is richly provided with blood vessels, and easily becomes inflamed. In the upper and back part is a large patch of lymph follicles stretching across from side to side and forming the so-called pharyngeal tonsil or tonsil of Luschka. This occupies the space behind and between the Eustachian tubes on each side and extends to the roof of the cavity as far as the choanae.¹

The tonsils are two more or less prominent bodies which vary much in size, and tend to disappear after the first few years of life. Each has on its free surface from ten to fifteen orifices which cause it to have a somewhat perforated appearance. These orifices lead into recesses or crypts in the substance of the tonsil. Around the walls of these crypts is a large number of lymph follicles, and between these is a quantity of less dense adenoid tissue. The tonsils are well provided with blood

¹ *Text Book of Human Anatomy*, by A. Macalister.

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vessels. There are at the base of the tongue, on each side of the middle line, masses of adenoid tissue, similar to the tonsils, and known as the lingual tonsils. The so-called 'ring of Waldeyer' is the name given to the adenoid tissue which is grouped around the area where the air and food passages intersect each other. The various 'tonsils' forming this are, from above downwards :—

- (1) The pharyngeal tonsil.
- (2) The so-called tubal or Eustachian tonsils, a mass of lymph follicles close to the Eustachian tube on either side.
- (3) The Palatine tonsils (tonsils proper), one on each side.
- (4) The lingual tonsils, one on each side.

These groups are joined together by tracts of mucous membrane, containing well-marked infiltrations of adenoid tissue. The various aggregations of adenoid tissue which are met with in the pharynx are most marked in children, and under conditions of health become much less marked before the individual reaches adult life. This fact has, as we shall see, an important bearing upon the origin of

certain catarrhal conditions. The larynx has a leaf-like lid composed of cartilage, or gristle, known as the epiglottis, which separates it from the pharynx. It is covered in the greater part of its extent with ciliated epithelium. Beneath this epithelium is the mucous membrane proper. This is provided with numerous glands which secrete abundant mucus. It contains numerous lymph corpuscles which in some places unite to form diffuse adenoid tissue and even lymph follicles. The epithelium of the trachea contains ciliated cells; it also contains some cells secreting mucus. Beneath the mucous membrane are mucous glands. The mucous membrane contains a considerable amount of adenoid tissue.

In dealing with the functions of the parts which we are considering, we have chiefly to consider the very important question of the powers of defence of the air passages (and thus of the body generally) with which these passages, and especially the nose, are endowed.

The air stream does not pursue a straight course through the nose, but passes in curves and eddies. It takes an elliptical course. Thus it enters at the vestibule, mounts in

succession to the middle turbinal, superior turbinal, and roof, and thence downwards to the naso-pharynx. The expiratory current follows more or less the same course. This considerable exposure to the large surfaces of the nasal cavity serves to promote the functions in regard to the inspired air (that is the air which is breathed in or 'inspired'), with which the nose is concerned, and about which I must now say a few words.

The principal functions are three in number, viz. to warm, moisten and filter the inspired air. The first two of these three functions may be considered together. We have seen that the mucous membrane over the turbinal bones is richly provided with blood vessels which alter greatly in size as the result of changes in the temperature or moisture of the air, and other causes, and the object of this provision of nature is in the first place to raise the temperature of the air which is breathed in; so that in a normal nose in the fraction of a second that is necessary for the air to reach the pharynx, whatever be the degree of external cold, it has become almost or quite as warm as the blood. Aschenbrandt and Kayser

have both shown independently that when the temperature of the external air is from 46° F. to 53° F. the temperature of the air after it has passed through the nose is raised to 86° F.¹ In the second place the same arrangement serves to add moisture to the air so as to bring it close to the dew-point, no matter how dry the outside air may be. The normal function of the mucous membrane is to secrete mucus, but if the secretion of this be in excess of the normal amount it becomes morbid; in other words, if the mucus be robbed of a small portion of the 93 per cent. of water which it contains it becomes thick and unhealthy. Herein we have an explanation of the fact that if the air which passes through the nasal fossae and so reaches the passages beyond, is not well charged with moisture, it rapidly injures the mucous membrane of these passages by depriving it of its moisture and thus causing an unhealthy condition of the mucus. The function of that mucous membrane would thus be interfered with to a greater, or less degree, and the amount of interference would obviously depend upon the quantity of

¹ *Diseases of the Nose and Pharynx*, by J. B. Ball, M.D.

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moisture of which it is deprived. The resulting unhealthy condition of the mucus causes a dryness and tendency to catarrh of the mucous membrane. This is probably the reason why inhaling steam does so much good in case of a cold. The usual plan is to add a little friar's balsam, eucalyptus, or similar antiseptic to the boiling water in the inhaling jar, but when the antiseptic has been unobtainable I have found excellent results from the inhalation of hot water only.

Thus the great function of the nasal cavities is to prepare the air which is inspired, so that it may exercise no injurious influence on the mucous membrane of the passages beyond. It has been estimated that in 24 hours over $1\frac{3}{4}$ pints of water is supplied by the nose.¹ Aschenbrandt found that expired air contains 2.77 grains of water to $5\frac{1}{4}$ quarts, which means that it is completely saturated; his results further indicated that about 7,700 grains are withdrawn from the body in 24 hours.²

Such an amount cannot be secreted by the

¹ *Diseases of the Nose and Throat*, by St. Clair Thomson.

² *A Textbook of Diseases of the Nose and Throat*, by F. H. Bosworth, M.D.

mouth, pharynx, or windpipe. In regard to the power of filtration exercised by the nose, this is both in regard to dust in the air, and also in respect to micro-organisms. In regard to the micro-organisms it is stated on the best authority,¹ 'that it must be a common event for 14,000 organisms to enter the nose during an hour's tranquil respiration.'

It will therefore be evident how extremely important are the functions by means of which these are filtered off and destroyed. The coarser particles of dust, as well as very many organisms, are caught in the vibrissae which, as we have seen, line the vestibule. Then again, the somewhat tortuous course which the inspired air follows, broken in upon as it is by the projecting turbinals, is calculated to favour the arrest of dust particles.² Those particles of dust or micro-organisms which gain access to the nasal cavity itself are expelled by the action of the ciliated epithelium, after having first become enmeshed in the mucus and lachrymal secretion. The cilia of the respiratory region of the nose act in a

¹ *Diseases of the Nose and Throat*, by St. Clair Thomson.

² *Diseases of the Nose and Pharynx*, by J. B. Ball, M.D.

backward direction, so as to drive the mucus or other secretion into the naso-pharynx; with it also are swept its contained micro-organisms and other impurities. The mucus which is secreted in the nasal cavities has been shown to be detrimental to the life processes of these organisms, even if it does not actually kill them. The vitality of the micro-organisms being thus lowered they are rendered more vulnerable to the attack of the phagocytes, which, as we shall see in the next chapter, are certain body cells which are protective in function. By this means the micro-organisms are practically all got rid of from the air before this reaches the naso-pharynx. When, owing to partial or complete obstruction of the nasal cavities, mouth breathing becomes a necessity, many of the micro-organisms which are inhaled are caught by the mucus which is poured out from the pharynx and carried with it to the stomach, where they are dealt with by the action of the gastric juice. Others, especially in young children, are destroyed by the phagocytes which are so plentiful in the adenoid tissue of the 'ring of Waldeyer.' In addition to these functions of the nose,

Greville Macdonald ¹ has carried out investigations which point to the fact that gaseous exchanges take place in the nose between the gases of the blood and those of the air, just as happens in the lungs. The uvula, together with the soft palate, assists the epiglottis in shutting off the cavity of the mouth during normal respiration.

¹ *Respiratory Functions of the Nose.*

CHAPTER III

CAUSATION

I. General Causes

IT will clearly be more rational, before attempting to deal with the prevention of the common cold, to say something about its causation ; for obviously prevention will consist in taking means to protect the individual from the action of these causes.

The disease may occur at any time of year, but is, at any rate in this country, more prevalent in the spring and autumn months. Again, whilst no age is exempt, nevertheless the common cold is relatively rare in infants or very old people. On the other hand it is extremely common in children, perhaps on account of the large amount of adenoid tissue which, as we have already seen, is met with in the upper part of the respiratory tract of young people. Broadly speaking, we may

classify the causes of the common cold into those which influence the body generally, and on the other hand those which act in virtue of their incidence upon particular organs in whole or in part.

Firstly, then, let us deal with the general causes, and in doing so it will be desirable to say a few words as to the defences of the body against the disease-producing organisms. It is now generally recognised that the actual exciting cause in many cases of a cold is the invasion of the body by one or more of the microscopic bodies known as microbes or micro-organisms. These are low forms of plant life.

There are many facts which point strongly to the infectious character of a common cold. It is well known that a cold may run through a house in such a manner that one person after another will succumb to it; and in other cases a cold can only be satisfactorily explained as the result of infection from another individual who is known to be suffering from one. Then again the abruptness of the onset, symptoms, and more or less regular course have much in common with

the corresponding manifestations of one of the acute infectious fevers.

Again, we have the fact that dwellers in remote islands are seized with colds when a ship visits them.¹ People returning to resume town life, either after a polar cruise or from a holiday, are specially liable to contract a catarrh. This can be explained on the assumption that they have lost their previously acquired immunity.

A patient of mine, who had come back from a big game shooting expedition feeling as fit as a man can feel, developed some few weeks after his return symptoms of tuberculosis of the lungs, ushered in by an ordinary nasal catarrh. His astonishment at its occurring 'just when he felt so fit' was intense. The explanation lies, I think, in the fact that he had been so long unexposed to infection that he had lost the immunity I have been speaking of, and his sense of fitness and the open-air life he had been leading had rendered him excessively scornful of anything that could possibly be termed 'coddling.'

It follows from this that special care is

¹ St. Clair Thomson.

necessary when one returns from a holiday ; whereas the usual tendency is to be less careful rather than more so. For example, people who have spent a holiday fishing or climbing, getting wet and suffering no apparent harm, should not on that account be neglectful as to changing damp clothes, and so on, when they return to town life. To plunge straight-way into a vortex of hard work or gaiety and late hours immediately on returning from a holiday is to court ill-health. The body needs a little time to re-adapt itself to its former conditions, and if this is done the ultimate benefit derived from the holiday will be infinitely greater. Although no definite causative micro-organism has as yet actually been discovered, yet there has been observed a distinct association of organisms of the so-called diphtheroid group with many cases of cold in the head.

We have seen in the last chapter that the respiratory tract, at any rate under conditions of modern civilisation, is invaded by no less than 14,000 organisms in an hour's tranquil respiration, and assuming that the special causative organisms of the common cold are

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among these, the question that will naturally present itself to the reader will be, not 'why does one catch a cold so often?' but 'how does one ever escape a cold?' This question naturally leads up to the further point, viz. that although the actual invading organism is the immediate cause of the infection, yet the influence of this will in most cases be void of power to harm the individual unless his resisting power be by some means lowered; and I must therefore now speak of the natural means of defence of the body and the reasons whereby these are overborne in disease.

We have seen that the respiratory tract is, in common with other cavities of the body, lined with epithelial cells, and these in health have the power of resisting the attacks of micro-organisms. Within the tissues also the liquid portions of the blood exert a destructive effect upon germs.

Then there is the phagocytic or devouring action of certain cells. These phagocytes have the power of taking up from the circulation bacteria and substances such as foreign particles, and of digesting them. Metschnikoff

was the first to elaborate the theory that these phagocytes were the defenders of the body against bacterial invasion. He was of the opinion that when a tissue or organ was injured, a mass of these cells was hurried to that tissue or organ to wall it off and prevent the bacteria from entering the body. Certain of the white blood cells have this phagocytic property, but in addition to these there are phagocytes among the fixed tissue cells. The adenoid structures which we have spoken of as existing in the respiratory passages contain accumulations of these active phagocytic cells. These various cells, resisting and phagocytic, are able to exercise their special functions in these directions only when their vitality is unimpaired. In other words they require, just as the body as a whole does, nourishment, rest, exercise, and the removal of effete products ; and when overworked they are no more capable of efficiently carrying out their duties of scavenging or protecting the body than an over-trained man is of doing himself justice in athletic competitions. Again, much will depend upon the strength of the invading organisms ; for obviously virulent bacteria will overcome the

powers of defence, whilst weaker ones on the other hand will be adequately dealt with by the resisting and phagocytic cells, so that the issue of the conflict will largely depend upon the relative strength of the tissues of defence and the invading organisms. The state of health of the cells which thus functionate in defence will doubtless depend largely upon that of the body generally ; but there is no doubt that in addition to this the various secreting organs, such as the liver and stomach, exercise important functions in protecting the body from disease.

There exists, as regards infection by a particular microbe, a predisposition in some people ; whereas others may be partially or completely immune to attacks by the same organism, or in other words possess what is called ' natural immunity.' Immunity however is often acquired. In some cases as the result of one or more attacks of illness, the result of infection by a particular microbe, the subject will, for a longer or shorter time, acquire immunity to infection from that organism. On the other hand, infection by a particular microbe does not always confer

immunity, but may even render the subject more liable to that infection. In illustration of the influence of the resistance of the tissues may be mentioned the classical observation that hens are under ordinary conditions not susceptible to attack by the bacillus of anthrax. When however the temperature of the hen is lowered by immersion in cold water, it loses to a certain extent its power of resistance, and hence will be no longer immune.

As regards the case of the common cold, it seems probable that any immunity that may be produced in an individual as the result of the infection is of but short duration. We shall now be in a better position to understand the rationale of the causes acting upon the body generally, and it is not too much to say that these are far more numerous than those which act merely locally.

An important cause which must be classed under this heading is exposure of the body to cold, especially cold winds, particularly after the individual has been in a heated room, for it is a not uncommon experience for one to catch cold as the result of going out into the open air at a low temperature after sitting

in a heated room, especially if at the same time one has been facing a blazing fire. On the other hand, another cause must be looked for when the reverse is the case, that is when one goes from a temperature which is low to one which is high. When the body is exposed to cold there results a loss of heat. This has to be made up by the use of material which should have been used to build up the frame ; for animal heat is developed from food which is eaten. Hence there will result defective nutrition of the tissues, the result of which will, if prolonged, show itself, especially in children.

Damp is another cause of colds, as are also fogs. The deleterious action of fogs is due doubtless to the large number of irritating particles of various kinds which they contain. As a matter of observation it is known that colds are, as we have seen, most frequent during the spring and autumn months, for at these times as a rule the temperature is moderately low, there are high winds, and further the air is decidedly damp. Bosworth¹ infers from this that the three factors, lowness of the

¹ *A Textbook of Diseases of the Nose and Throat*, by F. H. Bosworth, M.D.

temperature, motion of the air, and moisture, are necessary to produce a cold. He also points out that one at least of these three factors must as a rule act for a rather long time in order that this result may ensue.

Then, again, unsuitable clothing may be responsible. As a matter of fact, this is in many cases insufficient as regards its amount to the needs of the temperature at a time when the temperature has suddenly changed from a high to a low one. Or perhaps, even more frequently, the individual wears too large an amount of clothing in warm weather, and this is probably more especially true in regard to the lower classes. Even more important as a cause of catching cold is the want of regulation of the quantity of a person's clothing to the amount of exercise he is taking, or to the variations in temperature which occur at different times of the day. For instance, a man will wear a thick great-coat while taking a brisk walk : not only so, but he will take it off after he has finished his exercise, notwithstanding the fact that his body is then perhaps in a free perspiration. It is hardly a matter for surprise that in such a case he will probably catch cold, more especially if after removing

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the garment he occupies himself with a sedentary occupation in a room which is at a low temperature. In this case the victim of the cold has been guilty of two faults: he should have worn a lighter coat or none at all whilst taking the brisk exercise, and having finished his exercise he should not have removed his outer garment until he had cooled down a little. The need for regulating the amount of one's clothing according to the time of day is more important in hot weather than cold, as the daily variations of temperature are greater in the former case. This is particularly noticeable in high altitudes, and to a lesser degree by the seashore. Other causes to which the common cold may be due are lack of exercise, and also over-eating. Drs. Pritchard and Colbeck have brought forward reasons in favour of the theory that excessive ingestion of carbohydrates¹ (sugars and starches) may be a causative factor in various diseases, catarrhs being amongst them. Then again we have disturbances of the digestion, imperfect excretion, hunger, prolonged mental strain or depression; overwork, anxiety, and

¹ 'Carbohydrates and Disease,' *Lancet*, July 28, 1900.

muscular fatigue, especially when this supervenes upon free perspiration. Thus, exposure to cold following perspiration is much more dangerous than the same exposure when the skin although warm is dry, for in the former case there is an additional loss of heat from the surface of the body. Then, again, there will be more risk attending exposure to a low temperature after the individual has been indulging in active exercise, and is as a consequence perspiring freely, than when he has been made to perspire as the result, say, of taking a Turkish bath, for the reason that during the exercise there is produced a considerable amount of heat within the body, whilst during the Turkish bath this does not occur. It may however be doubted whether the mere exposure to cold even if the air be damp, following upon hard physical exercise, which was accompanied by free perspiration, is alone capable of producing a cold without some other factor being at work, this factor being presumably the presence of a special organism. For instance I have on various occasions spent an impromptu bivouac in the High Alps, without any untoward result whatever ensuing

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therefrom. On each occasion this happened after a day's mountaineering, the exertion in most cases being both prolonged and severe ; whilst owing to the fact that the occurrence was unforeseen no opportunity presented itself of putting on a sufficiency of warm clothing.

In fact, so far from that desirable state of things were we that my companions and I had only the ordinary extra sweater and stockings that all climbers take with them on a mountain expedition. On one of these occasions I remember we took off our boots so as to get a little warmth by wrapping our feet up in a rucksack, and in the morning our boots were frozen so hard that half an hour had to be spent in getting them on. Of course, had we intended to spend the night out, we should have made ourselves far more comfortable. I, for example, had an excellent sleeping bag at my hotel ; yet even under these distinctly uncomfortable conditions we took no bodily harm. The height at which these experiences were met with varied from 10,000 to nearly 13,000 feet above the sea-level ; on two occasions the air was certainly damp, and on one

the moisture was accompanied by a constant movement of air. In one instance the temperature cannot have been higher than some five degrees below freezing point, and in two others it must have been near freezing point. Here then was a combination of several circumstances which in ordinary conditions would justly be expected to produce a common cold; and the most obvious explanation of one's immunity would seem to be that owing to the purity of the air ¹ no opportunity presented itself for infection of the body with the special organism or organisms to which a cold is due. That low temperature is not alone capable of producing a cold is further shown by the experiences of Nansen and other Arctic and Antarctic explorers. In Captain Scott's account of his last expedition one notices that it was only when food failed that the party one by one succumbed to the rigours of the climate, and that while provisions were plentiful they were able to keep fit in spite of the biting cold and the general hardships of their existence.

¹ It has been shown that at such elevations the air is free from micro-organisms.

Other causes of colds are the excessive imbibing of alcoholic drinks, excessive smoking, and in fact excesses of all kinds. Then again those who are resident in houses where the air is contaminated by an imperfect system of drainage, or who in other words are exposed to the inhalation of sewer gas, are also specially liable to colds, and along with such insanitary conditions must be classed hot, crowded, ill-ventilated or dust-laden rooms. Town life, another contributory cause, probably acts, like the other causes we are now considering, by lowering the resisting power of the tissues; and indeed any influence which has this effect must be recognised as a cause of the common cold. It is probable that fat people are specially prone to colds, and the theory has been brought forward that this is to be explained as the result of defective aeration of the blood in these cases, owing to the hampering of the capillary circulation through masses of oily tissue.

Again, we have as factors rendering the individual liable to the disease, certain morbid conditions such as anæmia (bloodlessness), the child's disease known as rickets, disease

of the heart or of the kidneys, diabetes or tuberculosis. It is also known to be specially prone to attack those who, without suffering from any actual disease, are subject to gout or rheumatism. The numerous above-mentioned causes undoubtedly act in part or in whole by preventing the various means of defence of the body to which I have alluded from coming into effective action; it is however possible that they also partly exert their influence by an effect on the mucus which is secreted by the nose. We have seen in the last chapter that this under normal conditions exerts a detrimental effect upon the life-processes of the micro-organisms, and it is at least conceivable that this effect may be weakened or annulled by the various agencies which we have considered. Colds are more common in certain families than in others, and this may perhaps be due to a family likeness as regards the air passages.¹

A lady, hearing I was about to write on this subject, said to me, ' Well, how are you going to suggest I should prevent my hay fever coming on every year ? ' Hay fever, it is

¹ St. Clair Thomson, *Diseases of the Nose and Throat*.

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perhaps just as well to point out, has nothing whatever to do with the common cold, but is a disease which it is not my province to discuss in this book.

II. Local Causes and Infection

In regard to the causes which act locally, these operate just as do the more general causes by rendering the person more liable to the actual exciting cause of the cold, an exciting cause which we have already seen is in many cases due to microbes. In the first place any chronic-inflammatory condition of the various areas in which a common cold can start may be a cause, these areas being the nasal cavities, pharynx, tonsils, or even the larynx. Perhaps the most important of these causes are those having origin in the nasal cavities or the naso-pharynx. Frequently as the result of overgrowth of the adenoid tissue which, as we learnt in the last chapter, exists in the upper part of the naso-pharynx, and which is known as the pharyngeal or Luschka's tonsil, a condition known as 'adenoid growths' arises. These adenoid growths

are met with far more frequently in children than in adults. The effect of these adenoid growths is to produce more or less obstruction to nasal respiration, so that the subject becomes a 'mouth breather.' Hence the important functions of the nose in regard to warming, moistening, and filtering the inspired air¹ which we considered in the last chapter are to a greater or less extent lost, inasmuch as the inspired air has to some extent to enter by the mouth, and the tonsils, pharynx and larynx become obviously subject to more formidable attack. On the other hand, it must be borne in mind that the habit of mouth breathing may in itself be a cause of adenoid growths, and thus indirectly as well as directly of a cold. I cannot do better than quote Mr. E. M. Corner's words: 'As a result of mouth breathing the nasal cavities are insufficiently aerated and cleared, an infective condition of the mucous membrane of the nose results, and later hypertrophy (overgrowth) of the lymphoid tissue of the naso-pharynx or adenoids.'²

¹ Air which is breathed in.

² *A System of Medicine*, Allbutt and Rolleston, vol. i., Art. 'Physical Exercises.'

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Similar obstruction may be produced by the results of chronic inflammation of the nasal cavities themselves. In other cases of chronic inflammation of the nasal cavities the mucous membrane becomes atrophied, the cilia disappearing, the glands becoming diminished in number, and the venous spaces done away with, and this change in structure will evidently diminish to a greater or less extent the efficiency of the three functions mentioned above, and in consequence throw a greater strain on the other parts of the upper respiratory tract.

Other causes are deflections of the septum of the nose, or the presence of polypi. These polypi are simple tumours which occur in the nasal cavities, and the symptoms of which are chiefly due to the nasal obstruction which is associated with them. Then again we have in chronically enlarged tonsils, especially in children, a frequent cause of inflammation of these organs, and hence of a common cold. Another cause, and one which is often overlooked, is an unhealthy condition of the mouth known as pyorrhœa alveolaris, which may or may not be associated with

carious teeth. In that condition 'matter' is seen to well up between the edges of the gums and the teeth. Another occasional cause of a cold is the excessive use of the voice, such as occurs in cheering.

This renders the larynx liable to attack, and such a cold may spread so as to involve the mucous membrane of the pharynx and nose.

As has been already insisted upon, however, these general and local causes are as a general rule powerless to cause the cold without the action of the special infective organisms, and it will therefore be profitable to say a few words about the conditions under which such infection may take place. The common cold may undoubtedly be conveyed, just as are other infective diseases, by infection of the air, especially in rooms where ventilation is inadequate, and apparently when the room is unwholesomely hot. Thus it is frequently possible to trace the origin of the cold to a place of public amusement, such as a theatre or ball-room, or again the infection may occur in a church or at a lecture or 'reception,' or in a public conveyance such as a railway

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carriage or omnibus. The risk from railway travelling seems to be especially great on the Continent, especially in winter time, when the carriages are often overheated, and when there is usually an outcry, either from passengers or railway officials, if one attempts to admit any fresh air.

Then again the act of kissing may be the means of conveying the infection. There can be no doubt that the bacteria causing a cold may be conveyed by dust. It is no uncommon experience in these days of motor cars for one who has been riding or driving along a frequented road, especially in dry weather, to suffer from symptoms of inflammation of the uvula or tonsils as the result of dust inhaled, and for such an inflammation to be the beginning of a common cold; on the other hand, the nasal cavities may be the parts most affected. In many cases this cause may act in conjunction with others, for the individual may have become fatigued owing to severe and perhaps excessive walking or bicycle exercise, in the course of which he has perspired freely, and afterwards may have contracted a chill as the result perhaps of

sitting in a cold room before changing his clothes. No doubt also the dust, besides acting as a carrier for organisms, exercises a directly irritating effect on the mucous membrane. Another mode of becoming infected with a cold, and in my experience a particularly virulent type, presents itself among those in whom circumstances necessitate the arranging of, or reference to, books or pictures which have not been adequately dusted. At the time when I was Medical Registrar at one of the London hospitals, I frequently traced an acute and particularly intractable cold to my having sorted out, or otherwise come in contact with, certain books of records.

And here, if a mere man may be allowed to make such a purely domestic suggestion, I should like to point out the inadvisability of allowing dust to accumulate (as is the case in at least some households) on the tops of wardrobes and bookshelves, and inside cupboards, etc., for a year, and then having a vigorous 'spring clean,' with consequent disturbance of many and various microbes. Some of the maids, even if members of the family escape, are nearly sure to be attacked with severe

colds as a result of this procedure. Surely in most households it ought to be possible to keep these things sufficiently well dusted to render any great accumulation impossible. I would also point out that the keeping of boxes under beds is to be avoided, but if lack of space renders this imperative, as is I know the case in many flats, they should be carefully and frequently dusted. Again, should dusting and sweeping have to be undertaken by those liable to bad colds in the head, the danger of catching cold from this work is much minimised by using a slightly damp duster for furniture, as this prevents the dust from flying about and so being inhaled by the worker. Carpet-sweepers and vacuum-cleaners have done much to render the turning out of rooms more hygienic, by preventing the clouds of dust formerly raised by an energetic housemaid with a hard broom. I am aware of course that carpets are absolutely unhygienic, but am afraid that until all our houses are provided with parquet flooring, no words of mine will induce my readers to dispense with them.

Of course it will frequently and probably

usually be the fact that a cold owes its origin to more than one cause, and that several of the above-mentioned factors are at work in one and the same case.

Let us then summarise briefly the principal general and local causes. Among the former we have all influences which diminish the resisting power of the tissues, such as bodily or mental over-fatigue, over-eating, excesses of various kinds, the effect of cold, especially cold winds combined with damp, unsuitable clothing, and further the existence of constitutional disease. It must again be pointed out however that in most cases two or more of these causes are combined. Among the local causes the most salient are those conditions associated with nasal obstruction, especially adenoid growths. Some writers consider that one or other of these local causes is present in nearly every case of a cold, and undoubtedly it is a good rule to suspect the existence of one of them in every instance of frequently recurring colds.

It would seem however that these causes, whether acting generally or locally, must in most cases be supplemented by the action of

organisms, which may be conveyed to the individual through the medium of ill-ventilated rooms or conveyances, by kissing, or by means of dust.

Such then are the principal causes of the common cold. Being now equipped with some knowledge as to the manner in which these act, we are in a position to consider the all-important question of prevention, with which I shall accordingly deal in the next chapter.

CHAPTER IV

PREVENTION

I. Clothing

IN dealing with the all-important subject of prevention, it is necessary to bear carefully in mind the various factors to which the common cold may owe its origin. The question of infection, and its bearing upon preventive treatment, will perhaps be most conveniently left until we have considered the numerous other causes.

It will be well first of all to treat of the general causes, partly because one or other of these is usually responsible in any particular case, and further for the reason that in most instances, perhaps, the individual is more likely to have a definite local condition attended to than he is to avoid a cause which is general in its action.

We may begin with the consideration of the general health, and it will be convenient, after

considering certain widely applicable rules, to deal with certain conditions which obtain in modern life, and then to consider the subject as it affects children, for the age of the particular individual will have an important bearing on the regulation of the mode of life in regard to many matters of health.

It will obviously be of especial importance to avoid those conditions which are likely to give rise to colds in those who are specially liable to them, and at those particular times of year when they are exceedingly likely to occur, such as during the spring and autumn months, or of course at any time when they are particularly prevalent. In this connection it is well to remember that the individual is especially liable to contract a cold after a holiday spent in the country, especially if this be a long one.

We may conveniently begin with consideration of the clothing, for we have seen in considering the origin of colds that unsuitability in regard to the regulation of the amount of this in relation to external conditions, as well as to the taking of exercise, may be a causative factor. Such regulation is especially difficult

in a climate like ours, which is constantly changing.

The object to be attained is to wear enough clothing to ensure warmth and comfort, but no more than this. If more is worn the body will become overheated, excessive perspiration will ensue, and the person will become extremely likely to take cold. On the other hand, if too small an amount be worn, loss of heat will take place. Generally speaking the body should have the clothing distributed over it uniformly. It is a mistake, as a rule, when going into the open air to cover up a part of the body which is usually exposed, such as the face. Again, carefully to wrap up in mufflers or other garments a part of the body which is considered to be especially sensitive, such as the throat, is thoroughly unsound. Even if we do not by thus 'coddling' the part cause excessive perspiration of the area which we desire to protect we are rendering it more sensitive to the action of cold, and thus are actually running the very risk which we are above all things anxious to avoid. As has been well said by Bosworth,¹ the chest

¹ *A Textbook of Diseases of the Nose and Throat*, by F. H. Bosworth, M.D.

is infinitely better protected, in one liable to bronchial attacks, by an extra sole worn in the boot than by a felt pad worn across the chest. It is also highly undesirable to leave any part of the body insufficiently protected.

It is generally held that the best material for clothing worn next the skin is that made of wool, preferably knitted or not too closely woven, owing to the fact that wool is a bad conductor of heat, and so keeps the skin warm, and at the same time allows the perspiration to evaporate. Some authorities however prefer what is known as 'cellular clothing,' which consists of a material made of either silk, linen, or cotton manufactured in such a way as to contain air-spaces, and some garments made of Viyella, a mixture of wool and cotton, which can also be obtained in a cellular form, are manufactured. All these cellular substances are warm, as the contained air renders them bad conductors of heat, and as they are highly absorbent they quickly remove the perspiration from the skin. It was pointed out in the last chapter that an important cause of taking cold is to be found in the failure to regulate the clothing to the

taking of exercise. Whilst taking exercise, especially if this be hard, the clothing should be light, and more should be put on when the time comes to rest. Again, we have seen that another cause of a cold may lie in the failure to accommodate the amount of one's clothes to the varying temperature met with at different times of day, especially in summer.

Again, the care which it is necessary to bestow on the regulation of the amount of clothing will vary according to the age of the individual, and also according to his state of health. The adequate protection of the feet by boots which have soles of good quality is a matter of very great importance. The soles should be especially thick for use in wet, damp, or cold weather, for it must be remembered that a rapid loss of heat takes place from the body when the foot is cooled by such conditions.

Many a bad cold, and much consequent ill-health, has been caused, in my experience, to young girls on their first having a dress allowance, by their attempts to economise in this direction. The serviceable country boots and warm underclothing bought for

them in their schooldays gives place in many cases to something cheaper, in order that the money saved on those may be spent on more showy articles of attire.

Hats and caps are usually considered to be a necessity of our modern civilisation. These should be light, should not press heavily upon the head, and should be made of material which conducts heat well and is perforated, and porous, so as to allow of the escape of heat and moisture and to provide ventilation for the head. Incidentally, I may mention that this is also far better for the growth of the hair.

II. Baths

One of the most effective means of hardening the body so as to render it less liable to a cold is by judicious bathing, particularly by the cold bath. This is an admirable institution for the strong and healthy, but at the same time it cannot be too strongly insisted upon that it should not be taken without careful note of its effect upon the health. Many persons take a cold bath from a sense of duty without benefit when they would be doing

themselves real good by a tepid one ; again, it by no means follows that a bath which will suit a man on one day will necessarily be of benefit to him on another. The cold bath is one at a temperature between 40° and 60° F. It is usually taken in the form of the full-length bath in which every part of the body is immersed at the same time, but for those who are not very robust, or in good health, this should not be used, and it will be found that the substitution of a sitz bath is attended with satisfactory results. The effect of the cold bath is to contract the blood vessels of the surface of the body, and in consequence to drive part of the blood to the internal parts, and obviously the system will experience more shock if this action is a general one, as will be the case in a full-length bath, than if, on the other hand, the contraction of the superficial vessels takes place in one area of the skin at a time, as occurs in a sitz bath. The room in which the bath is taken should be well-aired and ventilated, and if the window can be open without a direct draught blowing upon the bather, so much the better. The immersion, if complete, should be

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of only a few seconds' duration, and the effect of the bath is enhanced if one at the same time cleanses the body all over with soap. After it has been taken the body should be dried and rubbed down with a rough towel. The bather should by that time experience a general warm glow, and a feeling of *bien-être*. If this reaction is wanting, and is replaced by a sensation of chilliness and perhaps loss of appetite and a headache, it is an indication that the bath is not doing him good, and that one at a higher temperature or a sitz bath instead of the full-length one should be substituted. If the cold bath is not well borne it should be replaced by a tepid or warm one. A tepid bath is one at a higher temperature than the cold one, but yet a temperature below the normal body temperature, whilst a warm bath is one at about the normal temperature. For those who are unable to bear the cold bath sponging of the neck and shoulders with cold water is an excellent institution. It should always be followed by vigorous rubbing with a rough towel. Immersion in the warm bath should be for not longer than five minutes. A hot bath is one distinctly above the body

temperature, say from 98° F. to 105° F. The warm bath will neither contract nor dilate the superficial vessels. On the other hand the effect of the hot bath will vary according to the time of immersion. Thus its first effect will be, like that of the cold bath, to contract the superficial vessels, but this initial tonic effect will be quickly succeeded by an opposite one, in which the first contraction of the vessels is succeeded by dilatation. Thus if the tonic action of the hot bath be desired, the immersion should be very rapid, and the effect will then be similar to that of the cold bath. If a less marked action be wished for, the immersion should be longer but yet not sufficiently prolonged to cause general relaxation of the vessels of the skin. If the effect of relaxation be wished for, the bath should be taken just before going to bed. The one exception to these rules that may be made is the following :—when a hot bath is taken after hard exercise immersion may be for a period of several minutes, but it should be followed at once by sponging the body all over with cold water, or by a shower bath, in order to counteract the relaxing effect of the hot water. The

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most suitable time for the routine daily bath is before breakfast, but it is also desirable to bath after exercise which has been sufficiently severe to cause marked perspiration, or indeed after any prolonged exertion. The temperature of the bath should in this case be regulated by the same rules which apply in the case of the daily bath ; but if over-fatigue has resulted or risk has been run of contracting a chill, such as might be caused by exposure to cold and damp after the completion of the exercise, the bath should be a hot one, and should be followed by sponging with cold water. It is important to note that no one should take a cold bath immediately after exercise, that is if he be hot and perspiring, but should give the body time to cool down first. Care should be taken after the hot bath to wrap up warmly during the passage from the bathroom to one's own bedroom. Many colds have probably been caught through the failure of the bather to protect the head and neck at this time. His head has probably perspired freely, yet he will walk along draughty corridors and staircases in adequate slippers and a satisfactory dressing-gown, but with no pro-

tection for head and neck. This is especially important in the case of the fair sex. A man can and often does wet his head with cold water at the finish of a hot bath, whilst for the majority of women this is an impossibility, therefore on the way to the bedroom a hood or cap should be worn, and the neck and top of the chest should be well protected.

It is not out of place to point out that especial care should be taken in the regulation of the temperature of the bath by middle-aged or elderly people ; and also by any one who is not in good health, particularly if he be a sufferer from disease of the heart or blood vessels.

For example, some years ago a middle-aged lady, a good deal out of health and suffering from frequent colds in the head, was brought to me by her daughter. With somewhat disconcerting candour the patient informed me that she herself considered doctors a quite unnecessary institution, but had yielded to her daughter's insistence. She believed, she added, in obeying the laws of health, and proceeded to instruct me on some of these points. At the mention of the cold bath I stopped her,

and on making a few inquiries elicited the fact that she felt cold and shivery after it, but had persevered, hoping to harden herself. After some little persuasion she was induced to try a tepid sponge down, while standing in warm water, with the result, I learnt afterwards, that she improved rapidly.

III. Fresh Air and Food

The importance of fresh air in the prevention of colds can hardly be over-estimated. Medical opinion has of late years undergone a marked change in the matter of the recognition of the importance of fresh air in the prevention and treatment of various diseases. It is even recorded that a well-known physician, many years ago, having been called in to a patient suffering from consumption, carefully scrutinised the room with a view to detecting and closing up any cranny where fresh air might enter. We saw in the last chapter how lack of proper ventilation, as exemplified in crowded 'At Homes,' lectures, churches, and also in public conveyances, may be a cause of colds.

The obvious moral is that ventilation should be efficient, and should be carried out as far as possible in such a manner that draughts are avoided. The risk attaching to draughts may however be overcome by habit; and the author has frequently observed that the resident doctors and nurses at the Victoria Park Chest Hospital are able to work in the wards with the windows open under conditions when other people who have not been rendered immune by practice would certainly contract catarrhs. The same immunity to catarrhs is enjoyed by the patients, many of whom live on open-air balconies in all weathers.

The question of ventilation is as important at night, during the hours spent in bed, as during the day, seeing that the average adult spends about a third of his life in his bedroom, while a child of course spends a much longer time there. People too frequently keep their bedroom windows closed after dusk, and this is especially the case during the winter months, and although there has been a marked improvement in this matter during the last few years, the custom of open windows at night is not

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yet sufficiently general ; or in many houses if a window is opened the good effect is marred by blinds and closely drawn curtains. There is no doubt that from a hygienic point of view the modern casement curtain is far more suitable than the old-fashioned blind, which in large towns it is practically impossible to keep clean.

Not only should the efficient changing of the air be attended to, but it should also be arranged that the temperature is neither too high nor too low, for either of these conditions, especially the former, will render the individual more liable to the incidence of a catarrh.

The question of food, in so far as it bears on prevention, can be dealt with in a very few words. We saw in the last chapter that over-eating may be a cause, or that on the other hand the amount of food may be insufficient to the physiological needs of the individual, so that his power of resistance may be interfered with, and another causative factor will be at work. Thus the amount of food must be adapted to the needs of the life of the individual, and this, albeit a counsel of perfection, will be easier to carry out in the

young than in the middle-aged or elderly. Thus more nourishment need be taken by one who is leading a life of active physical exercise than by him who is engaged in brain work ; yet the man who is indulging in a day's active exercise should eat less at each meal than on other days. If the exertion should have been carried to the point of fatigue, then the evening meal taken after it had best be a sparing one. Foods which consist largely of sugar or starch (known as carbohydrates) are better adapted for one who is engaged in physical exercise than are those which consist in great part of nitrogenous material (proteid foods). At the end of a holiday spent in great part in the enjoyment of physical exertion, such as mountaineering, care is needed on the return to the routine of a sedentary town life. The individual will probably have developed a large appetite as a physiological result of the unusual amount of muscular work thrown upon the body, and unless he curbs his appetite he will be liable to suffer from dyspepsia ; or even if no symptoms of this kind manifest themselves, yet doubtless an undue strain will be thrown upon his excretory organs. In

such a case also it is at least possible that another causative factor is present, for I have alluded to the theory that excessive ingestion of carbohydrates renders one liable to colds. Moreover at such a time an additional factor will be at work, inasmuch as he will in many cases be specially susceptible to the infection of a cold.

Again, great importance attaches to the regularity of meals, particularly if the individual be engaged in brain work. It is not within my province here to recommend any particular aperient. That the bowels should act freely each day is of course a *sine qua non*. Failure in this direction leads to ill-health, owing to the accumulation within the body of waste products, and thus, as we have seen, to the liability of colds of various kinds; it is certainly of the utmost importance to keep the bowels acting healthily, and if this cannot be done without an occasional aperient, then an aperient must be taken.

Another condition of which it is desirable to speak in regard to prevention exists in the case of people who are not robust, when for any reason they are compelled to leave a

country place and take up their residence in one much colder or bleaker, or where the air is much less pure. Such cases may occur when persons unused to the climate are compelled to live in one of our large northern towns amidst the smoke and chemical fumes to be found in these places, and catarrhal conditions may be induced in this way. People who are compelled to live under these conditions should try to strengthen themselves in every possible way. In addition to the treatment recommended in the earlier part of this chapter, such persons should take extra precautions; thick boots should be worn in all but the hottest and finest weather, and it would also be a wise precaution to change the stockings always after exercise. As regards the subject of clothing, I may say that in these cases I always advise a person to keep three different thicknesses of underclothing—a really thick set of, for example, vests and pants for winter use, a quite thin woollen or silk and woollen set for hot summer weather, and (most important of all) a set of medium weight woollen, to be worn as soon as the winter set becomes too heavy. These should be worn

all through the spring and autumn, and are excellent for cold days in summer. Of course I am not advocating this as a rigid rule for every one, but for all delicate people I am sure it is most important.

IV. Exercise

It would be difficult to emphasise too strongly the importance of regular and sufficient exercise in raising and maintaining the level of the general health, so as to enable the individual to resist catarrhal conditions. As regards amount and kind, it must be adapted to the physique and tastes as well as to the age of each person. It should always be remembered that if a man is engaged in hard brain work, while a certain amount of exercise in the fresh air is desirable, that there is nevertheless less energy to be spared for physical exertion than would otherwise be the case.

It will perhaps be most appropriate at this point to speak of the rôle of physical exercises, that is of the special variety of these known as respiratory exercises, as a factor in the

prevention of mouth breathing, more particularly in regard to the question of adenoid growths, for in the last chapter we learnt that the habit of mouth breathing is one of the causes of these growths.

These exercises are useful for adults, but are of far greater importance in the case of children. The following description is taken in the main from Mr. E. M. Corner's article on the subject.¹ I have also to acknowledge some valuable suggestions from Dr. Percy Lewis's book,² and also one by Mr. J. P. Muller.³ The movements, especially at first, should be carried out very slowly; all jerky movements and breathlessness should be avoided, and every now and then one should stop so as to take some quiet breaths. If the subject be weak, fatigue which does not pass off after resting for a few minutes should be avoided; in this case also the movements should be preceded and succeeded by light massage. In proportion as there is a gain in strength there should be greater rapidity

¹ Corner, article on 'Physical Exercises,' Allbutt and Rolleston's *System of Medicine*, vol. i.

² *Medical Exercises*.

³ *My System*.

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of the movements, so that more fatigue results. The exercises should be taken daily at approximately the same hour, should be finished half an hour before a meal, and should not be carried out immediately after a meal. The room in which the exercises are taken should be bright and airy ; and no clothes should be worn which in any way interfere with perfect freedom of movement or with the action of the skin.¹ Before the exercises are begun it is advisable for a medical man to examine the individual and especially to note the conditions of the heart, lungs, and abdomen, and to observe the difference between the circumference of the chest when fully expanded and contracted, and thus determine the amount of expansion of which it is capable. This examination should be repeated at regular intervals by the same medical man. Before starting the exercises it is necessary that the position when standing should be correct, as otherwise certain muscles will act at a disadvantage, respiration will be less efficient, and fatigue increased. The subject should

¹ Corner, article on 'Physical Exercises,' Allbutt and Rolleston's *System of Medicine*, vol. i.

stand erect, the shoulders should be brought back without protruding the abdomen, and the chest expanded. Besides the muscles which are ordinarily employed in breathing there are certain other muscles which are sometimes used, and it is partly with the object of bringing these into action that the arms are raised in some of the exercises which I shall now describe. Inspiration as well as expiration must be taken through the nose, the mouth being shut. This is of very great importance. Again, inspiration must be slow and deep, so as to expand the chest as much as possible, and whilst drawing in the breath the hands may be placed on the hips. While inspiring, the person should rise on the toes, and should lean the head a little back. When the chest is fully expanded the person should hold his breath for about ten seconds. By this means the temperature of the air is raised, it will in consequence expand, and still further increase the size of the lungs. After the pause expiration must take place, which like inspiration must be as deep and powerful as possible, and at the same time the heels and chin must be lowered. The raising and

lowering of the heels may be omitted at first by delicate people. The force of the exercise may be increased by several varieties of arm movements. Thus the extended (stretched out) arms may be slowly raised from the sides during inspiration, holding them at the same time rather back in a lateral direction, to the level of the shoulders. During expiration the arms are lowered. Or again, the arms are during inspiration raised slowly forwards as far as possible above the level of the head and again brought down during expiration. In raising the arms laterally the size of the chest is mainly increased in a direction from side to side, whereas on the other hand if they are raised forwards the diameter of the chest from front to back will be increased most. Again, during inspiration the arms, from the position of hanging by the side of the body, may be raised by the hands being moved upwards into the armpits as far as possible, the elbows being at the same time moved outwards; during expiration they are returned to their original position.

Or during inspiration the arms, from the position of being directed straight forwards

horizontally, are swung backwards horizontally as far as possible ; during expiration they are returned to the original position. Then again the pause of ten seconds may be utilised by bending the knees slowly as far as possible and also separating them and again straightening them ; or it may be occupied by bending the trunk forward until the fingers of both hands touch the floor (the knees being kept absolutely straight), and again straightening it and lowering the arms. Or finally the person may rise on the toes during the first inspiration, bending the knees as much as possible during the succeeding expiration. During the second inspiration the knees are to be straightened, and finally the heels dropped during the second expiration. Some of these exercises may be performed sitting, but they are all preferably done standing. The exercises may be conveniently summarised as follows :—

(1) Stand erect with hands on hips whilst slowly breathing in ; rise on to the toes and lean the head slightly back. Pause for about ten seconds ; then breathe out slowly, and whilst doing so lower the heels and chin.

(2) Stand erect, and while inspiring and

rising on toes and leaning the head slightly back, slowly raise the extended arms from the sides, in a lateral direction, holding them rather back; pause for about ten seconds; let your breath slowly go, and whilst doing so slowly lower the heels, chin and arms at the same time.

(3) Same as (2), except that the arms are raised in a forward direction.

(4) From the position of hanging by the side of the body the hands during inspiration as in (1) are moved into the armpits as far as possible, the elbows at the same time being moved outwards; during expiration as in (1) they are returned to the original position.

(5) During inspiration as in (1) the arms from the horizontal forward position are swung backwards horizontally as far as possible; during expiration they are returned to the original position.

Again, one may use the intervals between inspiration and expiration in (2) and (3) thus:—

(a) Separate the knees, bending them as far as possible; then straighten them again.

(b) Bend the body at the hips, keeping the

knees straight, until the fingers touch the ground ; then straighten the body again.

Or again, the interval between inspiration and expiration may be used as in (1), thus :—

(c) The body may be slowly lowered, and raised on the toes two or three times.

(d) The person may rise on the toes during the first inspiration, bend the knees as far as possible during the succeeding expiration, straighten the knees during the second inspiration, and drop the heels during the second expiration.

These movements may all be repeated a certain number of times, and carried out as slowly as is possible.

The breathing exercise in the sitting posture is a useful variation. It consists in the main in raising and lowering the trunk between the knees during inspiration and expiration respectively. For the involuntary or unconscious teaching of respiratory movements Corner¹ considers that 'steady running at a middle speed is best of all. Walking uphill is very good, and for stronger people short,

¹ Corner, article on 'Physical Exercises,' Allbutt and Rolleston's *System of Medicine*, vol. i.

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sharp sprints, with easy walking between, will do most.'

All these exercises will if judiciously taken prove beneficial to the majority of people, but it is wise for any one 'going in' for any unaccustomed form of exercise to make sure as a preliminary, by taking medical advice, that they are fit subjects for that particular form of exertion. For it must not be forgotten that there are many people who, not having any organic disease, are yet not robust, and are much more easily tired and much more liable to take cold than their stronger sisters and brothers. It is possible for many of these, by judicious feeding, clothing, exercising and resting, to become healthy members of society.

We have seen that a cold may be caused by mental or physical overstrain, anxiety, defective drainage and excesses of all kinds; the remedy in these cases is so obvious that nothing further need be said on the subject, and the various general and organic diseases to which I have alluded as being also causative factors will obviously call for treatment by a medical man. The influence of heredity as a factor clearly has no bearing on the subject

of prevention, inasmuch as a man cannot choose his own parents.

V. Winter Holidays in the Alps

During the last ten years or thereabouts the custom has grown up among men and women of the better classes in this country of taking a holiday of some weeks in the winter time at one of the Alpine resorts at which winter sports can be enjoyed, and needless to say in many cases they take their children with them. A holiday more conducive to health when sensibly arranged it would be hard to take. The good effects are in the main the result of the change of occupation and surroundings, and of the life of exercise in dry and very pure air amidst glorious mountain scenery, and with a large amount of sunshine. Nevertheless a number of colds are contracted both whilst staying at the particular resort selected, and more especially during the journey to and fro, which justifies one's giving a few words to the subject.

I have already dwelt on the risk of acquiring a catarrh whilst travelling by rail on the

Continent during winter. The individual may not improbably be out of health or overtired at the time he starts on his holiday, and in these circumstances will be so much the more likely to fall a victim to infection in the hot, ill-ventilated and perhaps overcrowded railway carriage. If nothing can be done to prevent the exposure to these conditions he will be wise as soon as possible to use a spray and adopt the other measures of which I shall speak when dealing specially with the prevention of infection. Unfortunately, such insanitary conditions will undoubtedly continue to exist until education as to the necessity of a sufficient supply of fresh air is much more general than it is at present.

Now I think an explanation of the existence of the common cold among the visitors at these Alpine health resorts (for to the best of my belief the natives do not suffer in this way) lies in the fact that a large majority of people do too much when they get out there. People accustomed to skating at Prince's, or who in their ordinary daily life at home indulge in really hard exercise, may be able to skate all day and dance all the evening with impunity,

but learners both of skating and ski-ing must remember that they are really taking a vast amount of exercise, and using a number of unaccustomed muscles; and the tonic effect of the air is so great that they often say at first that they feel as fresh at night as if they had done nothing all day. Dancing is much in vogue in these places, and many people having spent a morning in hard skating, and an afternoon learning to ski (a most active process), put in the time between tea and dinner in tobogganing, and dance all the evening, eating heartily at each meal.

People who go out for two or three weeks only are so anxious not to lose any time that they are especial offenders in respect of 'over-doing it.' After a few days of this, the accumulated effects of fatigue make themselves felt, and a more or less bad common cold is the result, sometimes accompanied by rise of temperature and a general feeling of malaise. Of course overheating of the hotel (or the reverse) or lack of ventilation of the lounge or drawing-rooms may have their share in the causation of these colds, but from my own observation I am convinced that these

colds would be considerably lessened both in number and severity if the visitor would rest for some part of the day. I can call to mind now as I write not one but several cases where people who should have been considerably benefited by the change have gone home feeling as if a thorough rest were their chief bodily desire. If it be too much to expect that after a day's hard exercise a man (or more possibly a woman) should rest in the evening, at any rate the time between tea and dinner should not be occupied in ice hockey or hard tobogganing unless the earlier part of the afternoon has been spent in a quieter manner, and a good night's rest should always be managed. What I have already said in relation to clothing whilst taking hard exercise applies with special force to ski-ing. In this sport the exercise is a really hard one, especially in its initial stages, as I think all who have tried it will agree. When a certain degree of proficiency is attained, periods of strenuous uphill work are separated by intervals of inaction (this will necessarily occur if the individual goes on an expedition) or of the comparatively mild exercise of running down-

hill. Hence the necessity for putting on additional warm clothing during the halts and for the downhill run. This may be conveniently arranged by taking in one's rucksack a woollen sweater or Cardigan; one of Shetland wool put on under the coat is very warm, as well as light to carry. During the last three or four years it has become increasingly easier to get in England things suitable for winter sports. Good reliable ski boots, and suits for both men and women of a smooth cloth to which the snow will not stick, can be bought in London and our large towns, and these are important matters if the ski-er, or would-be ski-er, is to keep dry and free from cold. A patient I attended on one occasion at a winter sport place traced the severe cold he was suffering from to the following cause: he went out to Switzerland with a pair of thick boots which he had fitted to skis. While learning, which he did quickly, he found them comfortable enough. Then came a short expedition—1000 feet up, some excellent snow and slopes above, and what should have been a delightful run down. His boots were not large enough to take the thick camel or goat's

hair sock always recommended for the purpose over his stocking, and his feet were wet through and bitterly cold after the first half hour. He had omitted to take an extra sweater up with him because of the trouble of carrying it, and because it was such a hot day. At the top, bright sunshine and a cool wind were encountered, and lunch had to be eaten in a draughty hay châlet. The other members of the party with their big boots and extra wraps took no harm ; my friend was the only one who suffered, and the last five days of his holiday were completely spoiled.

VI. Prevention of Infection, etc.

In regard to the prevention of 'colds' from the point of view of local causes, I must now say a few words. The most prominent of these are, as we saw in the last chapter, those associated with nasal obstruction, an obstruction which results especially from adenoid growths in the naso-pharynx. We also saw that mouth breathing may not only be the result of these growths, but is also a recognised cause of them, and that therefore nasal breath-

ing by means of respiratory exercise is a preventive measure.

This we have already considered in some detail, and I shall have again occasion to refer to it when speaking of children. If the adenoid growths are present their treatment will certainly be called for.

It is however necessary to point out that operative treatment will not be completely satisfactory unless it be followed by systematic breathing exercises. Again, chronically enlarged tonsils, if present, must be dealt with by the surgeon. If nasal obstruction from other causes than adenoid growths be present, these likewise must be dealt with; as again must any other local condition in the nose or pharynx, such as inflammatory conditions or polypi, and one must not forget the treatment of the teeth.

As regards the latter I am reminded of an article which appeared in one of our more chatty daily papers some few months ago. As far as I can remember, most of the evils to which the flesh of man is heir were in this particular article attributed to neglected teeth; just as in former days fashion for a time attri-

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buted all maladies to deranged liver or the lack of the cold bath. The crank is, I fear, always with us.

But there is no doubt that care of the teeth is a matter which should, and I think very frequently does, claim its full share of attention. Periodical visits to the dentist should form a part of the routine of life, and most parents I hope now recognise the fact that the care of even the milk teeth is not to be lightly disregarded.

Pus from teeth which are decayed is swallowed into the stomach, with consequent ill-health, and as has been remarked in the last chapter, anything which upsets the general health is liable to cause colds.

In those cases where the cold is liable to start with inflammation of the larynx, excessive use of the voice, such as occurs in shouting, is to be carefully avoided.

I must close this chapter with a few words as to the measures to be taken in regard to the prevention of direct infection. We have in the last chapter spoken of various conditions under which such infection is likely to occur, and while the exposure to them is in many

cases unavoidable, nevertheless when this has taken place measures can and should be taken which will prevent the organisms from gaining a footing in the body. People subject to colds will distinctly find it worth while after being present at a crowded reception, theatre or lecture, especially at a time when catarrhs are prevalent, to use a nasal douche or spray on their return home. A



glass nasal douche such as the K and O is to be recommended for this purpose. Having filled it with the particular fluid selected, the spout (a) is placed just inside one nostril, the finger being held over the vent (b). This latter controls the flow of liquid. The head is thrown back, the patient breathes naturally in and out through the partially

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opened mouth (this is important), and the finger is then taken off, or partly taken off (*b*). The fluid will run into the nasal cavity and naso-pharynx, the nostril on the side on which the fluid entered should then be closed by the finger, and the fluid allowed to escape through the other nostril, which is then cleared after the manner of the man in the street. The fluid should then be allowed to enter through the opposite nostril, and the whole process repeated. The fluid should be alkaline, and as a general rule should be warm enough to feel just comfortable in the nose. For many reasons I do not consider the ordinary ball syringe nearly so suitable for use as the kind I have mentioned. By carefully using the latter every part of the naso-pharynx is brought into contact with the liquid, and yet no force (which might drive some of the secretion into the Eustachian tube and thus cause bad effects) is employed.

A useful antiseptic substance is thymol, a solution containing which may be dissolved in warm water.

Besides the douche one of the various nebulizers, which emit the particular liquid used in

the form of a fine spray, should be employed. There are several excellent forms on the market, and I can testify from personal experience to the satisfactory character of these sprays. Persons who when recovering from a cold in the head constantly catch fresh cold when going out on a bleak or windy day will find great benefit in the use of one of these sprays, as the oily liquid which forms the basis of all of them protects the mucous membrane until it has regained its usual healthy condition, when of course the spray can be discontinued. The same remarks apply equally to the person who frequently gets a mild sore throat as the beginning of a cold, or to one who easily gets attacks of hoarseness or mild laryngitis, and to those who 'catch cold' in dusty, windy weather.

To employ one of these nebulizers the spraying nozzle should be placed within the mouth, the rubber ball squeezed, and the spray made to pass in various directions. If while the ball is squeezed the patient inspires deeply the fluid will pass into the larynx and windpipe. The nebulizer should also be used for spraying the nasal cavities ; close one nostril, sniff the

liquid up the other, and breathe out through the mouth : then do the same with the other nostril.

The liquid used is an oily one, such as liquid petroleum or paroleine, in which is dissolved some antiseptic or other drug such as eucalyptus, cinnamon, menthol and camphor. The nasal douche and a nebulizer should also be used if one has been in the same room with another who is suffering with a cold. Any one suffering from a cold should in the interests of others be isolated, preferably by confinement to bed, though I am well aware that such advice is unlikely to be followed.

The person who with a bad cold in the head refuses to stay in his or her room, either for fear of giving trouble or more usually because ' I never stayed in bed for a cold in my life ; I really do not approve of giving in like that,' comes downstairs, sits in a stuffy room, because he naturally feels chilly, and thoroughly infects it with microbes, had far better go to bed and stop there until the symptoms abate. The family of the victim would benefit, and the patient recover from the cold much sooner. It is perhaps scarcely necessary to say that

the kissing of one suffering from a cold is to be avoided. Finally any one who has been exposed to dust, whether on the high road, or as the result of sorting books, etc., should as soon as practicable wash out his mouth, gargle his throat, and use the nasal douche, and he may well finish up by the use of a nebulizer.

In cases of frequent recurrent colds it is worth while for the patient to consider the advisability of undergoing a course of vaccine treatment at the hands of an expert. In this method of preventive treatment he is inoculated with small amounts of growths of the actual organism which is believed in this particular case to be the cause, the object in view being to render him by this means immune to infection by that organism.

A word on the subject of airing beds and all articles of attire may not be out of place ; all housekeepers should look to it that their orders as regards this important matter are faithfully carried out. Numbers of colds, not to mention more serious illnesses, have been caused by neglect of these simple precautions. If I were to sum up as briefly as possible the most

salient preventive measures it would be in some such words as these: Attend to your general health, particularly to such matters as clothing, exercise and baths; attend immediately to any signs of nasal obstruction; and adopt measures to guard against direct infection as you would against the plague.

CHAPTER V

PREVENTION IN CHILDREN

I. Feeding and Clothing

IN considering the regulation of the general health in children in so far as this bears upon the prevention of a cold, it is necessary to speak incidentally of infants, bearing in mind that although the affection is less common in infants and aged people than in others, yet that it is more serious in the former, owing to the narrowness of the nasal passages, than in older children, and may give rise to shortness of breath and interfere with the taking of nourishment.

It will be desirable to deal shortly with the question of feeding, because it is well known that if this be in any way at fault a profound effect will be exercised upon the child's general health, and herein we have one of the most important causes of the disease known as rickets, with its special liability to catarrhal

conditions in general, of which as we have seen the cold is one variety. The most important points to consider in the feeding of an infant are the composition and amount of the food, as well as the frequency and regularity with which it is given. Then again it is also very important to attend to cleanliness, and to avoid over-crowding, ill-ventilation, want of sunlight, and exposure to cold and damp. These are indeed all causes of rickets, as well as of ill-health generally, and one authority considers want of sufficient exercise to be another condition responsible for this disease. The food of the young child should be as a general rule the milk of its mother, and this should form its only diet until the tenth month of its life. After that time the child should be weaned by the gradual addition of a suitable mixture containing cow's milk. The subject of infant feeding, important as it is in relation to the general health of the child, is not however one which can be appropriately discussed at length in this work.

It is not inappropriate to mention however that colds in children are frequently the result

of errors of diet, and perhaps more especially when the food consists too largely of carbohydrate material. It must be borne in mind that in regulating the general health with the object of preventing catarrhal conditions special attention should be devoted to children who have recently suffered from measles or whooping-cough, for the reason that catarrhs are especially prone to affect these.

As regards the clothing of children, this should be sufficient in amount to keep the skin warm but not moist except when active exercise is being taken. Dr. Clement Dukes considers that when moisture is perceptible on the skin under ordinary circumstances, by night or day, the clothing is excessive.¹ It should be light and soft as well as moderately loose. A porous material should be worn next to the skin, so that the perspiration on the skin may be able to evaporate. Overwarmth is almost as much to be avoided as insufficiency of clothing, and of the two is probably the more likely to give rise to a chill, owing to the excessive perspiration which it

¹ *A System of Medicine*, Allbutt and Rolleston, vol. i.

induces. Some children are delicate and remain delicate simply because they are overburdened with excessive clothing. On the other hand sufficient clothing is even more important for children than for adults. Dr. John Thomson rightly insists on the importance of the clothing being uniformly distributed over the body, and points out that many recurrent catarrhs are due to neglect of this rule.¹ Thus the arms and legs, as Dr. Eustace Smith has pointed out, as well as the bellies, should be properly protected. A knitted or flannel binder over the abdomen is as essential after the period of infancy as in a young baby, and it is important that a baby should wear long sleeves and stockings. It is hardly possible to lay too much stress on the importance of warm feet in maintaining good health in children. Dr. Dukes believes that the want of warm dry socks and thick boots is the commonest cause of enlargement of the tonsils, and that it is responsible for a large proportion of the cases of post-nasal growths.² It is best for the clothes a child wears next its

¹ *Clinical Examination and Treatment of Sick Children.*

² *A System of Medicine*, Allbutt and Rolleston, vol. 1.

skin to be loose woollen garments, such as knitted ones, and these may vary in thickness. They are warm, inasmuch as wool is a bad conductor of heat, but readily allow of the evaporation of moisture from the skin. The same principles apply to the clothing at night ; but the clothing should be a little warmer than during the day, owing to the want of exercise of the child whilst asleep.¹

II. Baths

A baby should have a bath once or twice daily, according to his strength ; if delicate he should be sponged instead of having a second bath. The temperature of the water for a young baby should be about 90° F., never higher than 95° F., and should be tested with a bath thermometer. This should be found in every nursery. As the child grows older the temperature of the water used may be lowered to 85° or even 80° ; nevertheless no hard and fast rules can be laid down in regard to this matter, for a bath at a tempera-

¹ *Clinical Examination and Treatment of Sick Children.*

ture which would be of distinct benefit to one child would cause another to be bluish and cold about the face and extremities, and perhaps depressed. Such symptoms will be signals that the temperature of the bath should be higher, or that the baby should simply be sponged instead. The bath should be given in a nursery where there is no draught, and the temperature should be at least 60° F. A young baby should not be immersed for more than one or two minutes, though the time may be extended as he grows older,¹ and after he is taken out he should be dried rapidly and thoroughly with a soft towel. Older children² should have a warm bath once daily, preferably in the evening just before going to bed. Three or four minutes' immersion will be enough, and the child should be dried with a rough towel. Ordinary cold douches given before breakfast are to be recommended for many children. For little children a cold douche in a modified form (65°-70° F.) is useful, but it must be used with caution and with strict attention to detail. It should be carried out after the child has

¹ *Health in the Nursery*, by Henry Ashby, M.D.

² *Ibid.*

been rapidly washed in hot water at a temperature of 100° F., and is still sitting in it, and the cold water should be poured over its shoulders. The child should then be dried at once and thoroughly. Dr. Eustace Smith recommends this, that if the child is weakly he should always first be rapidly sponged in a bath of hot water (100° F.), and whilst the douche is being given sit in the hot water.¹ Immediately afterwards he should be wrapped up and dried in a hot blanket and put back into his bed for a few minutes. He further recommends that the child should drink a cup of hot milk ten minutes before the bath.

He points out that this is the only way in which cold or nearly cold water can be used with advantage in the case of delicate or ill-nourished children, and he considers cold sponging highly objectionable.² The room should be warm, and care must be taken that the child does not chill himself before he is put in the bath. The cold douche thus carefully carried out is of great benefit to the general health of many children. It exercises

¹ *Diet and Therapeutics of Children*, Allbutt and Rolleston, vol. i.

² *Ibid.*

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a tonic effect, and if given rapidly renders them markedly less liable to take cold, even though they be pallid and delicate.

Should however the cold douche given with due precautions in the manner indicated result in certain symptoms, it must either be modified or discontinued. Such symptoms are chilliness and blueness of the extremities, which take the place of the usual healthy glow, or in other cases the reaction does not last and is succeeded by a feeling of chilliness. The douche may be modified by raising the temperature of the water to 75° or even 80° F.

Another plan is to substitute tepid salt water, which has a more stimulating effect upon the skin than ordinary water. In some children rubbing of the body with a coarse towel which has been wrung out in cold water is an excellent substitute. Children who have cold feet and cannot stand an ordinary douche may have their feet sponged with or placed in cold water and afterwards rubbed briskly with a towel. Also in those liable to throat colds this tendency will be diminished by sponging the throat and shoulders with cool water.

Again, it often happens that a child cannot stand the cold douche in winter but benefits by it in summer. A hot bath is useful as well as stimulating if given judiciously. It must be borne in mind however that it must not be given too hot, and the duration should be strictly limited so that the child should not remain in the bath for more than ten minutes at most. It should not be given more often than once a week. It is best given just before the child goes to bed in order that he may not catch cold. Children who are six or eight years of age may be allowed to bathe in the sea; the activity of the body and forcible movement of the water stimulate the circulation. They should not be allowed to bathe more than once a day. The head should be wetted first. The best time for bathing is either three hours after a meal or before breakfast. In the latter case the child should have a glass of milk and a biscuit first. The child should never on any account be allowed to bathe just after a meal, nor when he is either chilly or hot and perspiring. After the bathe he should be quickly dried and dressed, should take a brisk walk, and have a glass of milk and

a biscuit. If he seems out of sorts after the bathe it should be discontinued.

III. General Hygiene

I should like to say a few words about nurseries, because the liability of a child to colds in the head and other catarrhal affections depends so much upon the way he is housed. A whole chapter might be written on this subject, but this scarcely comes within the scope of the present work. Upstairs nurseries are undoubtedly the best, on account of the additional light, air and sunshine they possess, and in London and large towns are usually the rule. One would choose if possible not to have them immediately under the roof, on account of the heat in summer and the cold in winter, but in many London houses this cannot be avoided, and the only thing to do is to make the best of such accommodation as one finds. On the two top stories of a typical London house it is no uncommon thing to find the ceilings lower and consequently the windows smaller than in the other parts of the house. This is unfortunate for the small

inmates of the nurseries, as it makes adequate ventilation without draughts much more difficult. In such rooms it is a good plan to have a board made by a carpenter to fit into the lower part of the window frame: the window is opened, the board put in, and the window shut down on to it. A current of air comes into the room from between the two sashes, yet there is no draught. This device is however probably too well known to my readers to need description. On windy or very cold days this is an admirable thing in a low ceilinged room.

As the casement window is now so common in the suburbs and country a few words on the subject of ventilation in rooms with these windows may not be out of place. In many upstairs rooms there is no row of small windows above the ordinary casement ones except in the best bedrooms. This is a serious defect; for one thing it usually means that the ceilings are low, and high ceilings are more necessary in nurseries than in other rooms. Then on rainy and very windy days it is almost impossible to have the windows open, and at night if the weather is at all 'doubtful' it is scarcely

safe to leave the window open for fear of a storm. A mother who consulted me on the subject of her little boy's health told me that even when the window was left open as little as the construction of it allowed, the rain came right into the room, and also the draught through the small space was most trying. She compromised by having the door into the passage left open on such nights, and the window closed. This, although better than nothing, is not enough. In such cases a pane in at least one of the windows should be provided with a ventilator, which can be either open or closed, and this should be put in one of the upper panes of glass, as by this means the room will be better aired and there will be less draught. It is not an expensive matter, and is preferable to an ordinary wall ventilator.

There is a growing practice in the nearer suburbs of dividing large old-fashioned houses into double flats or maisonettes. People with children often like to take the lower of these flats, consisting of the hall floor and basement, and the children have as day nursery (sometimes as the only nursery) the basement room at the back of the kitchen, which leads into

the garden. The garden they say is so nice for the children, and where the house is perhaps a mile or more from any park this is a convenience, for certainly the more outdoor play as opposed to walking that young children have the better.

It cannot however be too strongly pointed out that it is imperative before taking one of these flats to have the drains thoroughly tested by a competent surveyor of one's own choosing, and to make sure also that the basement is absolutely dry. A case came under my notice not long ago of a child, previously healthy, who since having his nursery in one of these basements had had a series of colds, and slight but frequently recurring sore throats. A surveyor on examination reported that damp was welling up from a damaged concrete floor, which was underneath the wooden floor of the room. This was repaired, the child returned to his nursery, and is now healthy and free from colds. As regards the nursery furniture, briefly speaking, ordinary carpets should be dispensed with, a good cork carpet, which is warmer than linoleum, taking its place, and rugs, which can easily be taken out

of the room and shaken, being laid down. Casement curtains of some washable material should take the place of blinds, and in this way the amount of dust collected in a room is considerably minimised, and sunlight should be freely admitted.

Neither in nursery nor schoolroom should the sun's rays be excluded, except on the score of great heat, for the more sunshine a child can have the better. Children, like plants, do not thrive in dark places. The temperature should be from 60° to 65° F. Too great heat is specially deleterious to children. A screen should form a part of the furniture of every nursery, and should be placed so that a child playing on the floor will not be exposed to a draught every time the door is opened. Even when the door is shut in many houses strong draughts come in under the door, and a well-arranged screen should obviate all discomfort from this.

The practice which some inefficient nurses have of drying small garments, handkerchiefs, bibs, and other articles in front of the nursery fire is one which must be condemned. The steam permeates the air, makes it damp and

heavy, takes away the freshness of the atmosphere, and is very likely to give the child cold.

It is necessary for the sake of a child's health that he should have plenty of fresh air ; moreover in the case of a healthy child there is much more risk in confining him in close, ill-ventilated rooms than in exposing him to draughts. On the other hand it is of great importance that those children who are subject to colds, attacks of bronchitis, or of rheumatism should be protected from draughts. Young and delicate children should not be allowed out for long during windy weather, as such conditions rapidly remove the animal heat from them. Further, young children should not be taken out of doors if they are suffering from the results of a recent chill. Children when out of doors should be allowed to follow their natural inclinations as regards running about and indulging in other movements ; it is a mistake to force them to walk demurely. When in the open air they should not be exposed for too long a time to the cold.

These two precautions are important as preventives against their catching cold. If the child has become cold as a result of being

out in the open air, he should at once be taken into the house to be warmed again, after which he may be again sent out. In children past the age of babyhood who are well, it is wiser to err on the side of sending them out of doors too much than too little, so long as they do not get over-fatigued. There can be little doubt that, as a general rule, a young child will be more thriving if it lives in the country than if brought up in a large town, and this is especially the case during the hot summer months.

The seaside child, or the child who spends a summer holiday at the seaside, should indulge in paddling in a very moderate degree only, and I am at no time an advocate for letting the child paddle in deep water. There is a great risk of getting the extremities thoroughly chilled, and consequently a risk of colds of all kinds. Neither do I think a child should paddle at all times of the day—for example immediately after its midday dinner or in the evening. A child should never be allowed to tire itself by paddling, and its feet and legs should be well rubbed and dried before putting on the shoes and stockings again. I remember once hearing a doctor

who had a general practice in a well-to-do neighbourhood say that 'children paddling was worth £200 a year to him.'

As regards prevention in children from the point of view of local causes, it is necessary to point out that the outstanding local cause is due to adenoid vegetations, with the associated nasal obstructions, these growths being frequently associated with enlargement of the tonsils.

The only satisfactory treatment for these vegetations is their removal by operation, and the tonsils should also be dealt with by the surgeon. It is however impossible to lay too much stress on the importance of systematic respiratory exercises as detailed in the last chapter as a preventive of mouth breathing, and hence of the development of adenoid growths.

These exercises should be carried out by children and young people up to the age of about eighteen years; they will result in changes in the bones, and an increase in size of the whole cavity of the naso-pharynx which will render nasal breathing easier and more natural. Further, I must point out that the

operation for removal of adenoids is in the majority of cases unsatisfactory unless it is followed by respiratory exercises, which may be started a few days after the operation.

The remarks made in regard to direct infection in the last chapter apply equally to children. I would point out in conclusion that if more care were exercised in the bringing up of children in a hygienic manner, and if nose breathing were insisted upon from the earliest years, the physical and mental development of the human race would be so improved that we might with good reason hope that the common cold would become so rare as to be a clinical curiosity.

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